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TIMBER MANAGEMENT WORKING CIRCLE FOR THE BLACK HILLS NATIONAL FOREST - 1963

UNITED STATES GOVERNMENT

Memorandum

Department of Agriculture
Forest Service - Region Two
Denver, Colorado · 80225

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To: Regional Foresters and Directors Date: October 10, 1963

From: D. S. Nordwall, Regional Forester, By B. K. Crane

Subject: Plans

A copy of the Timber Management Working Circle Plan for the Black Hills National Forest is attached for your information. came

The Forest is now consolidated into one working circle and regulation is changed from volume to area. The expected yield from area control is slightly higher than the past volume allowable cut.

Long term management objectives, multiple-use coordination, description of timber condition, and other details are included in the Timber Management General Statement for the Forest. A copy may be obtained by writing this office.

Enclosure

B. K. Crane

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2410

TIMBER MANAGEMENT PLAN

BLACK HILLS WORKING CIRCLE
Black Hills National Forest
South Dakota and Wyoming
Region 2

July 1, 1963 - June 30, 1973

Submitted by /S/ J. Arthur Martin, Staff Assistant — April 1, 1963

Reviewed by Division of Timber Management /S/ Ernest J. Grambo (CCA) — August 1, 1963

Engineering /S/ Boyd O. Fisher (RDE) — August 12, 1963

Approved:

/S/ T. A. Schlapfer	Forest Supervisor	July 23, 1963
/S/ B. K. Crane	Acting Regional Forester	August 29, 1963
/S/ A. W. Greeley (DJM) (LRT)	Acting Chief	September 18, 1963

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SUMMARY OF PLAN

Table 1

Annual Allowable Cut

	Area	Yield		
		Cords	Board Feet	
			Int. 1/4"	Scribner Dec. C
	M Acres	M Cords	MM B.F.	MM B.F.
Harvest Cut				
Ponderosa Pine	16.40	35.0	60	50
White Spruce	0.13	3.3	--	--
Intermediate Cut				
Ponderosa Pine	20.0	130.0	20	17
White Spruce	0.12	1.2	--	--
Total	36.65	169.5	80	67

White spruce type may have a small amount of ponderosa pine.

Table 2

Annual Cut Objectives By Ranger Districts

Ranger District	Percent	Ponderosa Pine				Spruce	
		Area		Volume			
		Harvest	Intermediate	Sawtimber	Products	Area	Volume
		M Acres	M Acres	MM B.F.	M Cords	Acre	M Cords
Bearlodge	12	2.0	2.4	8	12		
Bear Mountain	11	2.0	2.2	7	3		
Custer	7	1.0	1.4	5			
Elk Mountain	15	2.5	3.0	10			
Fall River	7	0.4	1.4	2			
Hill City	5	1.0	1.0	4			
Nemo	10	1.5	2.0	7	8		
Pactola	6	1.0	1.2	5	6		
Rochford	11	2.0	2.2	8	11	125	2.3
Spearfish	16	3.0	3.2	11	5	125	2.2
Total	100	16.4	20.0	67	45*	250	4.5

*Cut will be below allowable cut until a paper plant is established in area.

Table 3

Area Summary By Land Classes and Ownership

Thousand Acres

Land Class	Ownership					
	National Forest		Other Federal	State, County, Municipal	Private	Total
	Unreserved	Reserved	Reserved			
Commercial Forest Land	1114.9	--	--	10.3	156.6	1281.8
Unproductive Forest Land	33.4	0.4	0.4	1.3	17.1	52.6
Reserved Productive Forest Land	--	4.3	6.5	--	--	10.8
Total Forest Land	1148.3	4.7	6.9	11.6	173.7	1345.2
Nonforest Land	66.7	--	2.4	4.2	108.0	181.3
Total All Land	1215.0	4.7	9.3	15.0	281.7	1526.5

Table 4

Area of Commercial Forest Land By Stand Size Class and Ownership

Thousand Acres

Ownership	Stand Size Class				Total All Classes
	Sawtimber	Poletimber	Seedling-Sapling	Nonstocked	
National Forest	692.0	369.6	36.6	16.7	1114.9
Other Public	5.1	4.8	0.2	0.2	10.3
Private:					
Forest Industry	33.9	20.5	2.3	1.7	58.4
Other Private	31.1	63.0	2.3	1.8	98.2
Total All Ownership	762.1	457.9	41.4	20.4	1281.8

Table 5

Area of Commercial Forest Land
By Forest Types and Ownership Classes

Thousand Acres

Forest Types	Ownership Classes: National Forest	Other Public	Private Ownership	All Ownership
Conifers:				
Ponderosa Pine	1094.3	10.1	154.2	1251.0
Spruce	20.6	0.2	2.4	30.8
Total	1114.9	10.3	156.6	1281.8

Table 6

Area of National Forest Commercial Forest Lands
By Stocking Class, Total Crowns, and Stand Size Class

Thousand Acres

Stocking Class	Stand Size Class: Sawtimber Stands	Poletimber Stands	Sapling-Seedling	Nonstocked Stands	All Stands
Well, 70% +	93.1	42.1	1.7	--	136.9
Medium, 40-70%	598.6	307.1	19.2	--	924.9
Poor, 10-40%	0.3	20.4	15.7	--	36.4
Nonstocked, 10%	--	--	--	16.7	16.7
All Classes	692.0	369.6	36.6	16.7	1114.9

Table 7

Total Softwood Volume for Commercial Forest Land
By Ownership

Million Units

Ownership	Total Volume				
	MM C.F.			MM B.F.	
	5.0-8.9"d.b.h.	9.0"+d.b.h.	Total	Scrib.	Int. ¼"
Forest Total					
National Forest	289	679	968	2,879	3,423
Other Public	3	5	8	22	27
Private	42	72	114	300	358
Total All Ownership	334	756	1,090	3,201	3,808

Table 8

Periodic Annual Growth and Mortality By Stand Size Classes

Stand Size Class	Annual Mortality Per Acre		Annual Net Growth Per Acre	
	Cu. Ft.	Bd. Ft.	Cu. Ft.	Bd. Ft.
Ponderosa Pine				
Sawtimber	1.2	4.6	25.0	93.8
Poletimber	0.9	0.7	17.5	26.2
White Spruce				
Sawtimber	12.7	58.6	46.6	194.9
Poletimber	--	--	7.8	10.0

Total Growth and Mortality for Forest

	MM C.F.	MM B.F.	MM C.F.	MM B.F.
Sawtimber	1.6	4.2	17.7	66.8
Poletimber	0.3	0.3	6.4	9.6

Table 9

Adjustment and Rotation Period

Type	Adjustment Period	Rotation Period
Ponderosa Pine	40	120
White Spruce	--	100

INTRODUCTION

The Black Hills Working Circle Timber Management Plan describes the 10-year action program for the working circle. Herein is outlined the action needed to realize the objectives set forth in the General Timber Management Statement for the Black Hills National Forest.

This plan will be revised by June 30, 1973, or earlier if needed to meet changing conditions.

The plan was prepared by the Timber Management staff of the Supervisor's Office with technical assistance from the Regional Office Division of Timber Management.

The inventory data on which this revision is based was collected as a cooperative project by the Regional Office and the Intermountain Forest and Range Experiment Station.

SUMMARY OF RESULTS UNDER PREVIOUS PLANS

The Black Hills Working Circle Plan consolidates the Spearfish, Rapid Creek and Harney Working Circle Plans into one. These three plans were last revised in 1953-1956. The combined allowable cut in the three plans totaled 60.1 million board feet of sawtimber and 40.8 million board feet for convertible products.

During the period 1953-1962, the actual sawtimber cut was 63% of the allowable cut, and products were 16% of the allowable. The actual cut fell short of the allowable because of insufficient demand for the timber. Demand is increasing for post, pole and pulpwood material. Established industry in the northern part of the Forest has not been adequate to utilize the allowable cut of sawtimber.

VOLUME SOLD AND CUT
By Sawtimber and Products
1958 - 1962

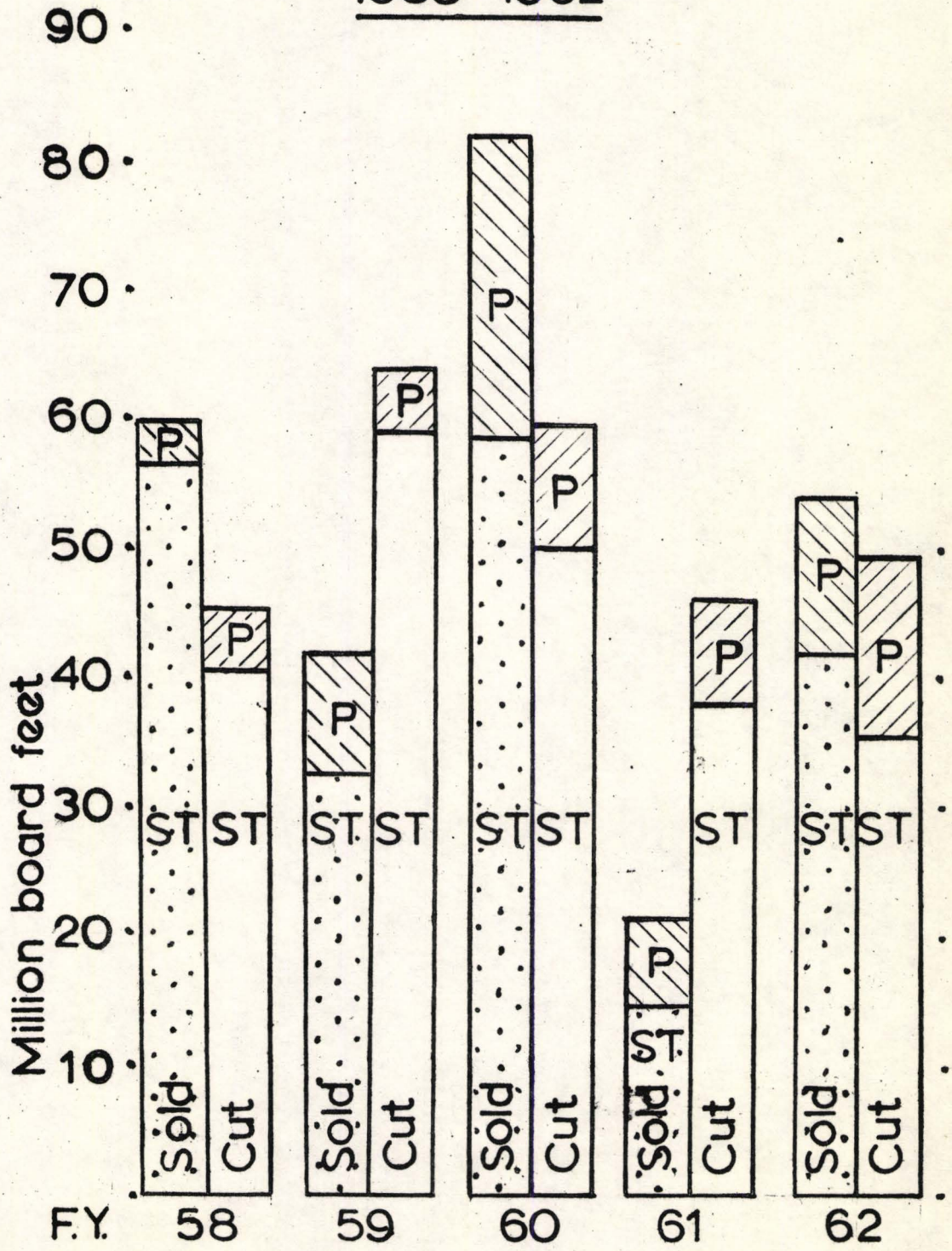

Figure 1

AREA BY STAND SIZE CLASS

1953 and 1962

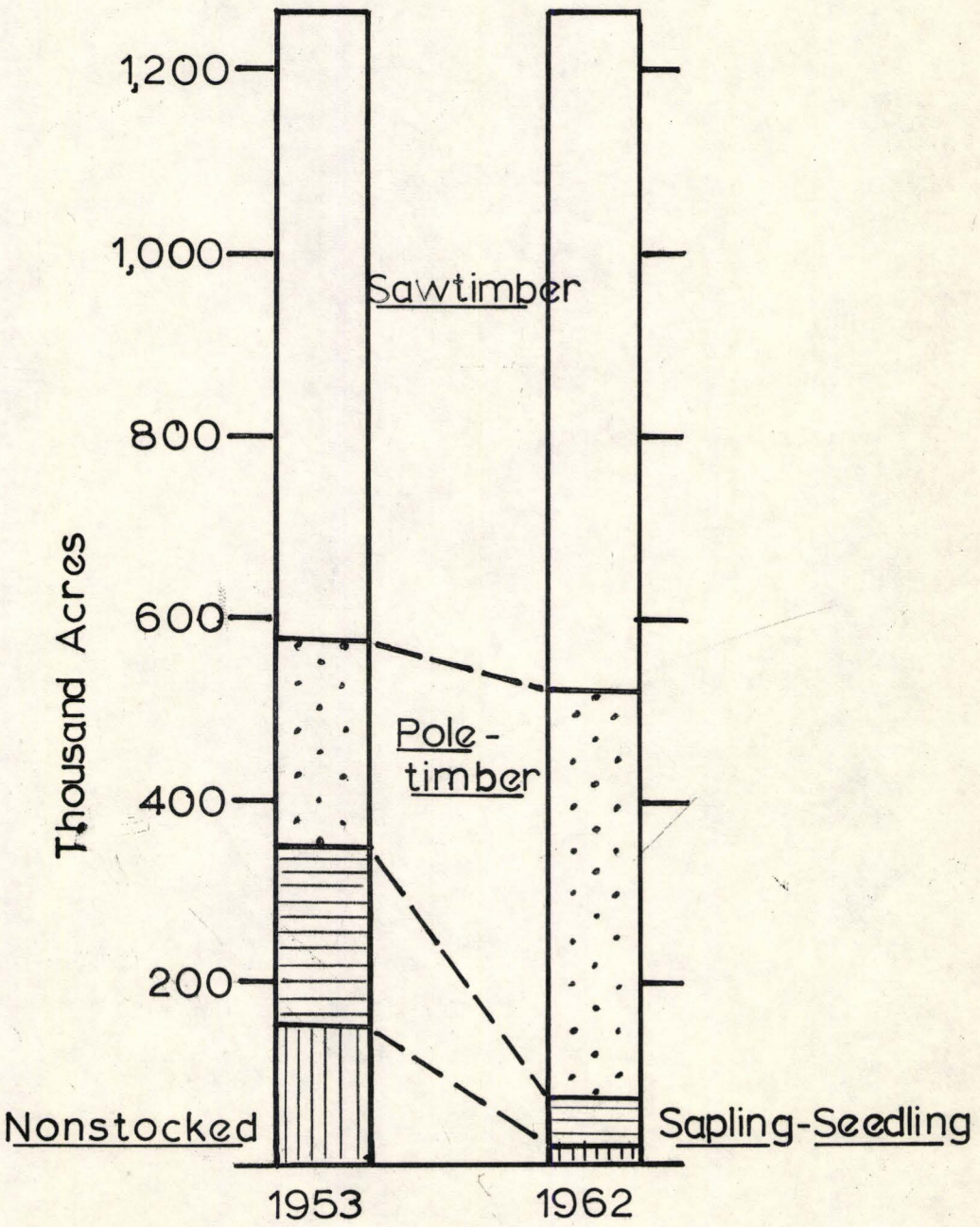

Figure 2

Recent Timber Stand Improvement and Reforestation Accomplishments

Fiscal Year	Planting Acres	Seeding Acres	Site Preparation Acres	Plantation Release Acres	Thinning Acres	Pruning Acres
1958	454	1,056	---	---	4,403	282
1959	1,836	40	---	---	3,913	642
1960	1,723	40	852	---	5,420	1,237
1961	1,062	110	1,060	---	4,360	2,180
1962	1,040	---	871	1,040	5,495	544
Totals	6,115	1,246	2,783	1,040	23,591	4,885

Some 212,000 acres have been put in good growing condition during the last 10 years by planting, precommercial and commercial thinning, regeneration and harvest cutting.

Protection Accomplishments

Disease Control

Removal of trees bearing peridermium cankers (Peridermium harknessii) is an incidental planned part of every cutting operation.

Fire Control

Between January 1, 1953, and December 31, 1962, 1,739 fires burned 4,245 acres of National Forest commercial forest land, an average loss of 424 acres per year.

Insect Control

During the last 10 years the Forest has carried on maintenance-control treatment of beetle infested trees. The 1962 beetle population demands project control efforts in 1963.

MANAGEMENT OBJECTIVES

The purpose of this plan is to set up a 10-year action program working toward meeting the long range objectives of the General Timber Management Statement approved December 6, 1961.

1. Meet the allowable cut objectives by FY 1973. This will require the expansion of mill capacity to process sawtimber-size material north of the "Base Line". Work toward the establishment of a paper mill or other similar industry that will use the 165,000 cords per year of wood not suited for sawtimber.

2. Complete the compartment analysis program for all commercial forest land by not later than the end of this planning period. Update cutting budgets, reforestation plans, stand improvement plans, etc., annually in order to meet the prescribed treatment of the stands on schedule.

3. Re-examine the permanent growth and mortality plots in 1970.

4. Maintain adequate stocking in all stands below rotation age by scheduling intermediate cuts at not more than 20-year periods.

5. Continue the reforestation program with the objective of completing the current backlog by the end of this planning period.

6. Intensify the Black Hills bark beetle control program to curtail the current increasing trend in insect population.

REGULATION

Regulation will be by area, with the allowable cut expressed in both area and volume. Control will be by 10-year periods. Undercuts which have accumulated during a part of the period may be cut during the remainder of the period, provided that the total 10-year cut does not exceed the allowable periodic cut by more than 10 percent. Control of the allowable cut will be by type area and not by products or species. Sales programs will normally exceed allowable cut objectives; otherwise the average annual cut will fall short of meeting the objective. Efforts to increase the current actual cut will continue until experience shows the allowable cut objectives are assured.

The financed cut for any one year is based upon volume. The financed cut quota should be sufficient to meet both volume and area objectives for the Forest as a whole.

Should the relationship between area and volume be found out of proportion for the Forest as a whole, the volume allowable cut will be adjusted to be consistent with area regulation. No adjustment will be made, however, before the end of the first 5-year period.

Types to be Regulated

There are only two major timber types in the working circle, both of which will be regulated. These types are:

1. Ponderosa Pine
2. White Spruce

Rotations

Previous plans were based on a rotation of 160 years for calculating the allowable cut. This plan uses a 40-year adjustment period in which to remove the current overmature overwood in ponderosa pine.

The following rotation periods are used as a check for calculating allowable cut:

Ponderosa Pine Type - 120 years

White Spruce Type - 100 years

The growth and mortality plots will be read at 10-year intervals. The adjustment period may be changed to reflect any increase in mortality.

Method of Cutting

The Region 2 Management Guide for Ponderosa Pine will be applied in designating timber for cutting. This guide provides for a two-cut shelterwood system with even-age management as the objective.

A seed cutting will be prescribed when the pine stands reach about 100 years of age and the spruce stands reach about 80 years of age. Approximately one-half of the stocking will be removed. The pine stands will be cut back to about 80 square feet of basal area for average sites. The spruce should be cut back to an average of about 100 square feet of basal area per acre. If spruce is to be continued on the site, a wind-firm stand must be maintained.

Intermediate cutting will be prescribed in the pine at not more than 20-year intervals for the purpose of maintaining growth and improving the quality of the stand.

Presale prescriptions will describe the method of cutting and other treatment required for individual stands in each timber sale. Prescriptions for treatment will be based upon stand conditions and the multiple-use objectives for the land as defined in the Multiple Use Management Guide for the Black Hills and District multiple-use plans.

Timber management along roadsides, streamsides, waterfronts, and in recreation areas and buffer zones will be aimed at maintaining healthy stands of pleasing appearance.

The cutting of timber in existing developed recreation areas, or on sites for which development is planned before 1975, will be done in accordance with the recreation plan for the specific area. Generally, cutting will be confined to removal of trees which are a physical hazard, or which harbor insects or disease that threaten adjoining timber.

Sanitation and improvement cuts of timber in roadside strips and travel influence zones (Category 3 areas) along highways U. S. 16, 16A, 385, S. D. 40 and other major roads may be authorized by the Forest Supervisor for the purpose of maintaining a healthy stand of timber. A three-cut shelterwood may be prescribed when necessary to maintain esthetic values. Cutting will be in accordance with FSH 2413.15a (T.D. #15).

Immediately after logging or thinning in areas of high esthetic value, a complete slash disposal job will be done by chipping, piling and burning or physical removal.

Growing Stock

The forest inventory has divided the timber types into stand-size classes and stocking classes. The definitions for the classes are given in Forest Survey Standards FSH 4819 and the field instructions for the survey.

The standard size classes are:

Sawtimber	9.0" d.b.h. and larger
Poletimber	5.0" - 8.9" d.b.h.
Seedling-saplings	1.0" - 4.9" d.b.h.

DISTRIBUTION OF CUBIC VOLUME BY AGE CLASS

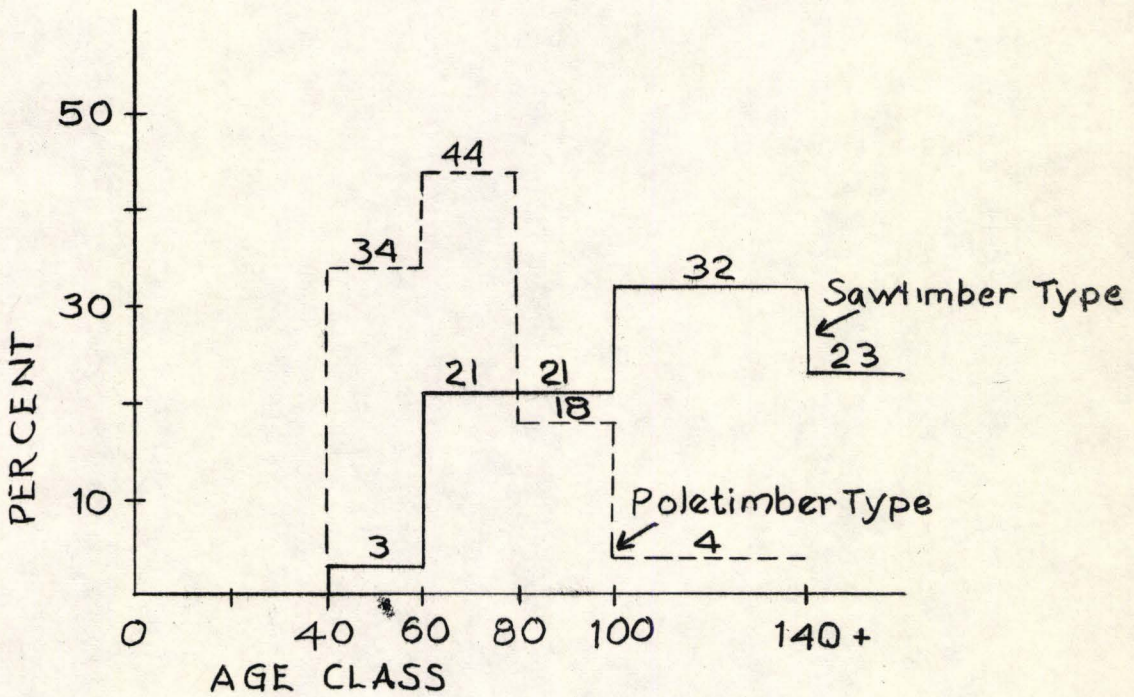

Figure 3

DISTRIBUTION OF VOLUME BY DBH CLASS

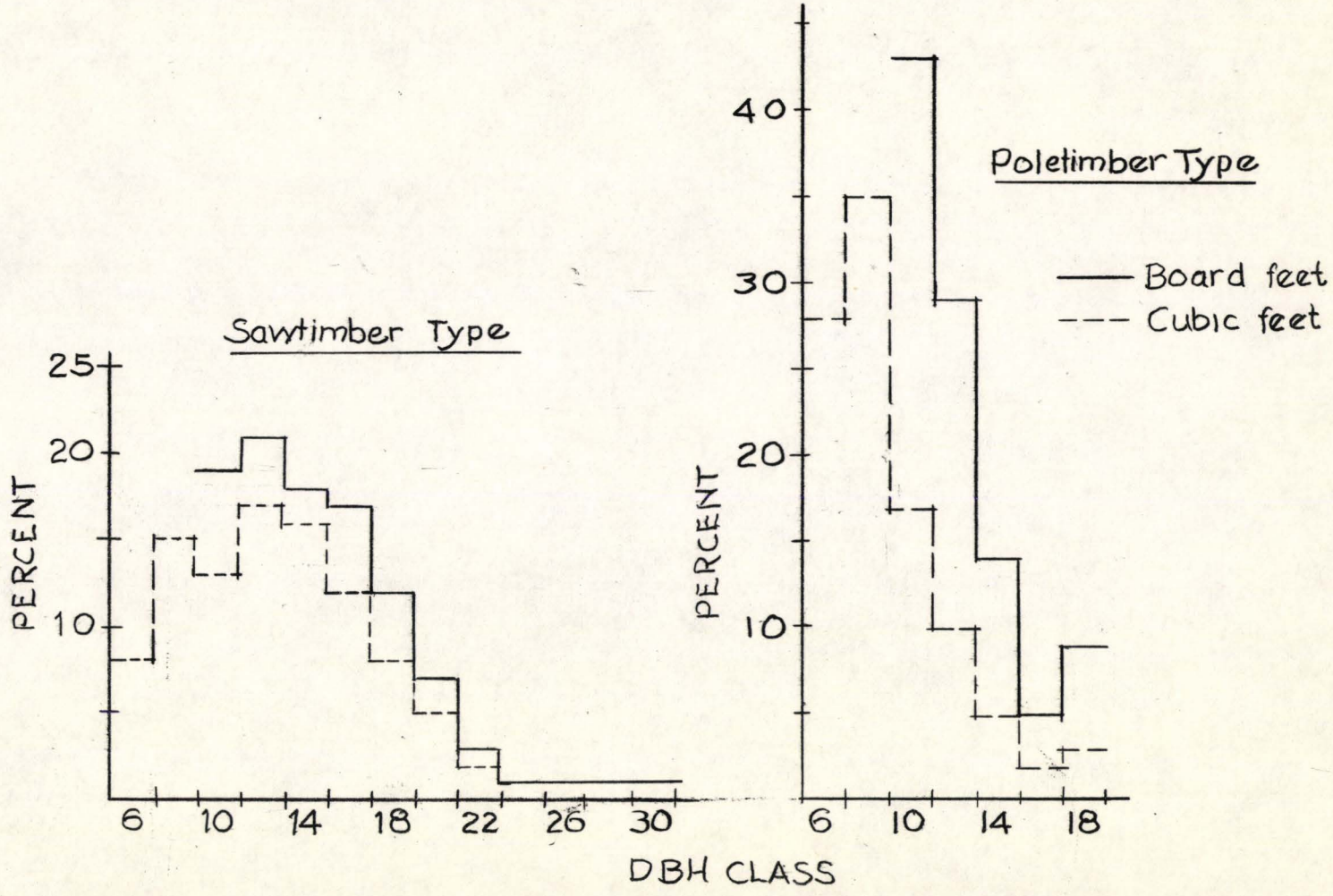

Figure 4

Sawtimber stands are those which have a net volume of 1500 board feet (International $\frac{1}{4}$" log rule) or more per acre in trees of 9.0" d.b.h. and larger. Poletimber stands are those that fail to meet the definition for sawtimber stands, are at least 10% stocked with trees 5.0" d.b.h. and larger, and the plurality of cubic volume is in trees 5" to 8.9" d.b.h. Sapling-seedling stands are those that fail to meet the above conditions, but are at least 10% stocked with trees 1.0" to 4.9" d.b.h. Nonstocked stands are those which are less than 10% stocked and fail to meet minimum conditions for the above classes.

Stocking classes or crown density classes refer to the extent to which growing space is presently utilized by growing stock trees of commercial species. The classification is based on the percent of crown closure. Stocking for sawtimber types is shown for total crowns and for sawtimber crowns. Stocking classes for poletimber and sapling-seedling stands are based on percent of crown closure of all trees regardless of size.

Classification	Percent of Crown Closure
Nonstocked	0 - 9
Poorly stocked	10 - 39
Medium stocked	40 - 69
Well stocked	70 +

The stands were not delineated by other condition classes. A condition class survey will be a part of the compartment analysis program. In the meantime, the condition of trees in the permanent growth and mortality plots will be applied to the stands as a whole.

Table 10

Distribution of Area of Commercial Forest Land By Stand Size Class

Stand Size Class	Ponderosa Pine			White Spruce		
	Gross Area M Acres	Percent of Type	Total Area To Be Regulated (M Acres)	Gross Area M Acres	Percent of Type	Total Area To Be Regulated (M Acres)
Sawtimber	673.7	62	600.0	18.3	89	15.0
Poletimber	367.3	34	300.0	2.3	11	2
Sapling-Seedling	36.6	3	35.0	--	--	--
Nonstocked	16.7	1	15.0	--	--	--
All Classes	1094.3	100	950	20.6	100	17

Growth and Mortality

Growth and mortality are based on data from 404 permanent plots at 133 locations. The data is summarized in Tables 11 and 12. Gross growth is based on the estimated radial and height growth for the period 1951-1960. Mortality is based on the actual mortality between the establishment of the plots in 1953 and the second examination of the plots in 1960.

The periodic net annual growth for the working circle is 24.1 million cubic feet or 76.4 million board feet.

The annual mortality of 4.5 million board feet is due largely to disease (48%), insects (25%), and weather (23%).

Table 11

Periodic Annual Net Growth and Mortality
By Type and Stand Size Class

Type and Stand Size Class	Volume Per Acre						Total Volume			M Units		
	Net Growth			Mortality			Net Growth			Mortality		
	Cubic Feet	Board Feet Scrib	Board Feet Inter ¼"	Cubic Feet	Board Feet Scrib	Board Feet Int ¼"	Cubic Feet	Board Feet Scrib	Board Feet Inter ¼"	Cubic Feet	Board Feet Scrib	Board Feet Inter ¼"
Ponderosa Pine												
Sawtimber	25.0	93.8	101.9	1.2	4.6	5.3	16,806	63,202	68,648	830	3,124	3,574
Poletimber	17.5	26.2	32.1	0.9	0.7	0.9	6,417	9,617	11,792	316	261	315
Spruce												
Sawtimber	46.6	194.9	228.0	12.7	58.6	66.2	845	3,567	4,172	233	1,072	1,211
Poletimber	7.8	10.0	12.5	--	--	--	18	23	29	--	--	--
Total												
Sawtimber	25.5	96.5	105.2	1.5	6.1	6.9	17,651	66,769	72,820	1,063	4,196	4,785
Poletimber	17.4	26.1	32.0	0.9	0.7	0.9	6,435	9,640	11,821	316	261	315
Total	22.7	72.0	79.7	1.3	4.2	4.8	24,086	76,409	84,641	1,379	4,457	5,100

Table 12

Annual Mortality by Cause of Death
Based on Period 1953--1960

Cause of Death	Volume per Acre			Total Volume M Units			Per Cent	
	Cubic Feet	Board Feet Scrib	Board Feet Int ¼	Cubic Feet	Board Feet Scrib	Board Feet Inter ¼	Cubic Feet	Bd Feet
Disease	0.8	1.9	2.2	891	2,130	2,463	63	48
Insects	0.2	1.0	1.0	271	1,141	1,282	19	25
Weather	0.2	0.9	1.1	226	1,053	1,195	16	23
Porcupine	0.02	0.1	0.2	20	141	182	1	3
Animals	--	0.01	0.02	5	15	17	1	1
Others	--	--	--	3	5	6	--	--
Total	1.3	4.0	4.6	1,416	4,485	5,145	100	100

Calculation of Allowable Cut

Ponderosa Pine Type

There is a total of 1,094 thousand acres of ponderosa type within the working circle. It is estimated that 950 thousand acres should be regulated for timber production, and the allowable cut is based on the latter area. The difference between the gross and net area is due to poor sites that are not producing merchantable stands of timber, Category I and II recreation areas and areas of spruce along stream bottoms that were less than 10 acres in size and were included in the pine type.

Eighty-five percent of the sawtimber size stands are characterized by a poor stocking of sawtimber size trees and a medium or better stocking of understory of saplings and poletimber. The overstory is normally past rotation age and is the residual of past shelterwood cuttings. Since most of this area has been restocked and the reproduction is well established, the overwood should be removed as a harvest cut and intermediate cuts should be scheduled at not more than 20-year intervals in order to maintain optimum growth. Products such as pulpwood, posts, etc., will be cut on a scheduled yield from the intermediate thinnings and stand improvement operations.

The remaining 15 percent (90,000 acres) of the sawtimber-size type is characterized by being medium stocked with sawtimber size trees with a poor to medium stocked understory. Most of this stand condition class needs a seed cutting, i.e. the first shelterwood cutting. The harvest cut would then be scheduled about 20 years after the regeneration cut. Intermediate cuts will be scheduled as needed in order to control the stocking and to keep the stands in production.

The following summarizes the area, volume per acre, and annual net growth for each of the sawtimber condition classes:

Sawtimber Stocking Class	Area M Acres	Volume per Acre		Annual Net Growth Per Acre	
		Cu. Ft.	Bd. Ft.	Cu. Ft.	Bd. Ft.
Poor	510	973	3,109	23	82
Medium	90	1,824	6,608	36	168
Total	1,600	1,100	3,634	25	94

Table 13 shows the area allowable cut for the next 40 years as computed by the tabulation method.

The annual regulated cut for the period July 1, 1963, to June 30, 1973, is set at:

Harvest cut -- 16,400 acres with a yield of 17.8 million cubic feet.
Intermediate cut -- 20,000 acres with a yield of 150.0 million cubic feet.

The above yield may be broken down by products as follows:

	Sawtimber Board Feet	Posts, Poles, Pulpwood, etc. Cubic Feet
Harvest Cut	50 MMBF	2.7 MMCF
Intermediate Cut	17 MMBF	10.0 MMCF
Total Scribner Dec. C	67 MMBF	12.7 MMCF
or Inter. $\frac{1}{4}$"	80 MMBF	165,000 cords

Converting Factors

Cubic feet to board feet -

Scribner Dec. C	3.33
International $\frac{1}{4}$"	3.93

Cubic feet to standard cords 77.

The harvest cut will come largely from areas delineated as P9WP and P9MP on the timber type maps and photos. The intermediate cut, including seed cutting, will come from areas delineated as P9WM, P9MM, and P8W or M.

Volumes per acre from the harvest cut have averaged 4 to 6 thousand board feet. The seed cuts average about 3,000 board feet per acre. The average cut for roundwood products such as pulpwood and posts has been about 7 cords per acre.

The Kemp formula gives an estimated annual cut of 14,000 acres and 70 million board feet. The Black Hills formula estimates the annual cut at 66 million board feet.

White Spruce

White spruce will be managed on a 100-year pathological rotation. Spruce stands, ten acres and larger, were delineated as follows:

18.3 thousand acres of sawtimber size stand.

2.3 thousand acres of poletimber size stand.

In addition there was an unestimated area of mixed type, i.e. pine and spruce and areas less than 10 acres of pure spruce included as pine type. Cutting the 20,000 acres of spruce over a 100-year period would amount to 200 acres per year.

A two-cut shelterwood system will be applied to the spruce stands. The seed cut is to take place when the stand reaches about 80 years of age and about one half of the stocking will be removed.

The average current volume per acre is 2,190 cubic feet (95 percent spruce and 5 percent pine).

The periodic annual net growth is 47 cubic feet per acre and the average annual mortality is 13 cubic feet per acre.

There is little or no demand for white spruce for sawtimber. Occasionally, there have been demands for spruce pulpwood. The yield is therefore calculated for pulpwood.

The annual allowable cut for the spruce type for the next 10 years is:

Harvest Cut	--	130 acres @ 25 cords per acre =	3,300 cords.
Seed Cut	--	120 acres @ 10 cords per acre =	1,200 cords.
Total		250 acres	4,500 cords

Table 13

Periodic Allowable Cut and Yield

Period		Periodic Area Allowable Cut M Acres	Periodic Yield Cubic Feet Volume Per Acre Beginning of Period CF	Net Growth Midpoint CF	Total CF	Total Volume MMCF
1st FY 64 to FY 73	Ponderosa Pine					
	Harvest Cut	164.0	970	115	1085	178.0
	Intermediate	200.0	912	180	1102	150.0
	White Spruce					
	Harvest Cut	1.3	2190	235	2425	3.0
	Intermediate	1.2	--	--	--	2.0
2nd	Ponderosa Pine					
	Harvest Cut	135.0	1200	115	1315	178.0
	Intermediate	190.0	--	--	--	150.0
	White Spruce					
	Harvest Cut	1.1	2660	235	2895	3.0
	Intermediate	1.0	--	--	--	2.0
3rd	Ponderosa Pine					
	Harvest Cut	115.0	1430	115	1545	178.0
	Intermediate	190.0	--	--	--	150.0
	White Spruce					
	Harvest Cut	0.9	3130	235	3365	3.0
	Intermediate	0.9	--	--	--	2.0
4th	Ponderosa Pine					
	Harvest Cut	96.0	1660	115	1775	178.0
	Intermediate	190.0	--	--	--	150.0
	White Spruce					
	Harvest Cut	0.8	3600	235	3835	3.0
	Intermediate	0.8	--	--	--	2.0

Allowable Cut Beyond the Adjustment Period

The allowable cut beyond the adjustment period should increase if the current allowable cut objectives are obtained. The commercial forest lands will have had two intermediate cuts and the overaged overstory will have been removed, putting the area into good growing condition. The present 300,000 acres of poletimber size stands will have grown into sawtimber size and a large percentage will have reached the rotation age. There should be altogether some 500,000 acres of sawtimber size stands by the year 2000 A.D. Net growth of at least 150 board feet per acre can be expected in the sawtimber size stands. Growth in the poletimber size stand should average one-half cord or more per acre per year.

Cutting Budget

Table 14 sets up the cutting budget by ranger districts for this planning period. As compartment analysis is completed, some changes will be made in the budget. The three-year action program will be reviewed each year, revised when necessary, and updated. This will permit the orderly harvesting of the timber throughout the Forest.

The cutting budget for products will be revised to include sufficient volume to meet allowable cut objective at the time a wood fiber industry in the area becomes a reality.

TRANSPORTATION

Table 15 shows the roads, to be constructed from appropriated funds, needed to remove the timber listed in the 10-year cutting budget. This program will be reviewed and updated annually in the 3-year action plan.

Roads to be constructed by the timber purchaser will be listed in the 3-year action plan. The standard will be defined in the timber appraisal and sale contract (see FSH 5610 et al.).

The purchaser will be required to install and maintain drainage on all of his constructed roads, regardless of the class of road, that will be adequate to protect the watershed from accelerated erosion. Engineering assistance will be needed in locating about 20 miles per year of roads to be constructed by the purchaser.

Rights-of-Way

Table 16 lists the rights-of-way needed in connection with the removal of timber listed in the 10-year budget. The date that the rights-of-way will be needed is also shown. This program will be firmed up, annually, in the 3-year action plan.

SALES POLICY

Sale Units

The size and location of proposed sale offerings as itemized in Table 14 are designed to balance the allowable cut among the ten Ranger Districts. Proposed offerings are varied to meet the demands of individual operators and to encourage expansion of the industry. The large number of relatively small operators, coupled with the landownership pattern and geographic character of the working circle, dictates that most of the offerings be 5MMB.F. or less. Where compartments containing greater volumes lie within reach of larger mills, offerings up to 25MMB.F. are planned. The avowed policy of the Black Hills National Forest is to provide the opportunity for operators to maintain an average of three years' supply of timber under contract.

Changing conditions may require substitution or rescheduling of some sale offerings stated in the cutting budget. Should changes become necessary, the entire sales program should be re-analyzed to sustain the overall pattern of timber removal and road development during the 10-year period.

Points of Manufacture

Sale offerings will normally be appraised to the nearest railhead, where adequate manufacturing facilities usually exist. Processing of timber within the boundaries of a sale area will not be permitted.

Merchantability Specifications

Merchantable trees and merchantable products cut from those trees shall equal or exceed the following specifications for all coniferous species.

Products	Tree Specifications		Product Specification			
	DBH	Units per Tree	Length	Diameter Small End	Net Scale in % of Gross Scale	Minimum Net Scale
Sawtimber	10.0"	1	8.0 ft.	8.0"d.i.b.	33	20
Pulpwood	5.0"	2	8.0 ft.	4.0"d.o.b.	*	
Posts	5.0"	2	6½ ft.	4.0"d.i.b.		

*Must be reasonably straight and sound.

Maximum stump height is 12 inches at the high ground side.

Logging Methods

Tractors or animals may be used for skidding. Cable systems will generally not be permitted. Presale prescriptions will stipulate measures to be taken to protect residual stands from logging damage and will specify limitations which should be included in the sale contract.

Slash Disposal

Slash disposal plans will conform to standards and guidelines in FSH 2-2442.8, FSH 2480 and FSH 5150. Logging slash will be lopped and scattered so it lies close to the ground. In addition, slash will be piled and burned or chipped, or it will be physically removed from areas of high esthetic value and along sufficient spur roads or fire lanes to break up areas of continuous slash into units of 40 to 80 acres or less. All snags will be felled on areas where 100% slash disposal is done along roads, fire lanes and other special treatment areas.

TIMBER STAND IMPROVEMENT

Timber stand improvement work will consist largely of the control of stocking to prevent stagnation of growth. Precommercial thinnings will be scheduled where needed as soon as the overwood has been removed and the trees in the stand begin to express dominance. At least one noncommercial thinning will be required before the stand reaches a merchantable size for posts and pulpwood.

Thinning will be given top priority in stand improvement work. Pruning for other than red rot control may be scheduled after provisions have been made to accomplish all desired thinning operations.

The annual precommercial thinning requirement is estimated to be 8,000 acres. Sale area betterment deposits should finance 5,000 acres. The remaining 3,000 acres is a backlog in other than sales and will require appropriated funds.

There are some 63 thousand acres of pine type with a noncommercial hardwood overstory. Of this total, 10 thousand acres are in need of underplanting and another 15 thousand acres are in need of a fill-in planting. In addition, 20 thousand acres should be examined and where necessary a release operation will be scheduled.

Reforestation

The current reforestation program averages 2,000 acres per year. The program will continue at not less than this level with objective of completing the backlog job during this 10-year planning period.

A compartment analysis program was initiated on the Forest in FY 1963. This program will firm up the reforestation plans at the compartment level.

PROTECTION

Insects

Insect Conditions. The Black Hills beetle (Dendroctonus ponderosae) is a serious and persistent threat to ponderosa pine. An epidemic outbreak in 1948--49 and another in 1952--53 were followed by a low endemic condition until 1962. A pronounced rise in beetle numbers has created epidemic conditions, the worst of which is centered around Crooks Tower. This pest exhibits an increasing tendency to attack young timber.

The pine engraver beetle (Ips oregoni) reaches local epidemic proportions occasionally, but does not pose a widespread serious threat.

Action Program. Planned, systematic and thorough surveillance must be employed to detect insect activity before it becomes serious. Positive efforts will be made to reduce the basal area of young pine stands by commercial thinning in the areas where beetles have persistently been active. Noncommercial thinning will be done in separated areas during the summer. After thinning for two weeks, work will be stopped in a given area and resumed at a distance of not less than one mile from the previous site. Thinning will not be done during the summer within a mile of fresh logging slash.

Disease

Peridermium commonly occurs throughout the pine stands. In all thinning operations, infected trees will be marked for removal.

Animals

Porcupines. All Forest Service personnel carry on a continuous killing program. Other forest users are encouraged to kill these rodents. Strychnine bait boxes will be concentrated in plantations and recently thinned areas.

Other Rodents. Mice cyclically increase to the point where they damage plantations. They will be controlled by placement of poisoned grain.

Big Game. Past experience indicates that deer damage to plantations can be severe. Plantations will therefore not be established on heavily used winter game range.

Livestock. All plantations will be fenced, if necessary to protect the trees from animal damage. The fences will be maintained until the saplings are well established and above browse height.

Fire

Provision is made in all sales for slash abatement or for added protection until the hazard created by the slash has dissipated.

Protection Program. A slash treatment plan will be prepared for each sale area as described in FSH 5100.

The forest will maintain the equipment and protection organizations necessary to keep commercial timberland fires within the annual "PAR" given in the forest fire prevention plan.

RECORDS

A system of compartment records and maps are on file in each Ranger District office. The records on some districts go back to 1939. These records will be continued, using form R2-2400-19 and will be posted annually. Instructions for posting the form and maps are in the Record Atlas.

Compartment analyses and management prescriptions will be filed by compartments at the Ranger District office.

Aerial photographs showing timber type delineations, compartment boundaries, and ownership class are filed with the compartment records. Microfilm of each photograph, mounted in aperture cards, are on file in the Supervisor's office.

The processed inventory data on IBM tab sheets with summaries is on file in the Supervisor's office.

Timber drain by area and volume will be posted annually on form R2-2400-13a. Copies will be maintained as part of this management plan in the Ranger's, Supervisor's and Regional office.

Permanent growth and mortality records are on file in the Ranger's and Supervisor's offices.

SUPPORTING DATA

This plan revision is based on the 1960-62 timber inventory. Volume, growth and mortality were based on the permanent growth and mortality plots. Areas were calculated from type delineations on aerial photographs. The data was processed by ADP facilities in the Regional Office.

Sampling Error

Volume data was based on data taken from 404 permanent plots at 133 locations. The sampling error based on cubic feet in trees 5.0" d.b.h. and larger, is 3.8 percent (one standard error).

Table 14

Ten Year Cutting Budget By Ranger Districts

1963 - 1973

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Bearlodge District					
10	2,500	12,000	1,430	10,000	1964
2	400	1,900	--	--	1964
12	2,350	11,300	290	2,000	1965
1	400	1,900	--	--	1965
9	--	--	1,430	10,000	1965
5	120	586	--	--	1966
10	1,110	5,308	--	--	1966
18	100	500	--	--	1966
15	--	--	1,720	12,000	1966
6	630	3,000	--	--	1967
1	630	3,000	--	--	1967
11	--	--	500	3,500	1967
14	--	--	500	3,500	1967
19	--	--	500	3,500	1967
12	940	4,500	--	--	1968
15	420	2,000	--	--	1968
18	--	--	800	5,600	1968
3	--	--	300	2,100	1968
8	--	--	350	2,450	1968

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Bearlodge District, Cont'd.					
6	830	4,000	--	--	1969
18	210	1,000	--	--	1969
16	--	--	500	3,500	1969
14	3,120	15,000	--	--	1970
4	--	--	200	1,400	1970
7	--	--	100	700	1970
13	--	--	150	1,050	1970
97	830	4,000	--	--	1971
1	--	--	500	3,500	1971
19	1,670	8,000	--	--	1972
92	--	--	500	3,500	1972
98	1,230	5,900	--	--	1973
1	--	--	400	2,800	1973
Bear Mountain District					
467	--	6,000	--	--	1963
526	100	455	--	--	1964
525	250	1,200	--	--	1964
575	--	--	360	2,500	1964
500	520	2,500	--	--	1964
571	1,460	7,000	--	--	1965

Compartment Number	Sawtimber Acres	Sawtimber MBF	Products Acres	Products M Cords	Fiscal Year
Bear Mountain Dist., Cont'd.					
533	--	--	290	2,000	1965
532	1,120	5,357	--	--	1966
586	100	462	--	--	1966
499	220	1,070	--	--	1966
493, 494	--	--	460	3,200	1966
282	730	3,500	--	--	1967
431	520	2,500	--	--	1967
446	--	--	1,200	8,400	1967
536	--	--	360	2,500	1967
286	630	3,000	--	--	1968
430	630	3,000	--	--	1968
432	360	1,750	--	--	1968
484	--	--	1,800	12,600	1968
396	830	4,000	--	--	1969
453	420	2,000	--	--	1969
393,394,395	--	--	2,600	18,200	1969
580,581	1,670	8,000	--	--	1970
464	--	--	1,000	7,000	1970
475, 477	--	--	1,600	11,200	1970
589	730	3,500	--	--	1971
454	360	1,750	--	--	1971

Compartment Number	Sawtimber		Products		Fiscal
	Acres	MBF	Acres	M Cords	Year
Bear Mountain Dist., Cont'd.					
455	420	2,000	--	--	1971
456,457,458	--	--	2,600	18,200	1971
282	670	3,200	--	--	1972
286	1,000	4,800	--	--	1972
452	--	--	1,300	9,100	1972
473,476,478	--	--	1,900	13,300	1972
396	830	4,000	--	--	1973
455	520	2,500	--	--	1973
429	500	2,400	--	--	1973
428	520	2,500	--	--	1973
431,433,435,444	--	--	2,500	17,500	1973
469	--	--	500	3,500	1973
Custer District					
669	--	2,768	--	--	1963
648,669,668	630	3,000	--	--	1964
656,657,658,655	940	4,500	--	--	1964
632,642,634,635	520	2,500	--	--	1964
676,698,677	630	3,000	--	--	1965
685,686,687,522	520	2,500	--	--	1965
665,664,663	520	2,500	--	--	1965
722,723,684	520	2,500	--	--	1966

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Custer District, Cont'd.					
700,675,672	630	3,000	--	--	1966
705,628,629	520	2,500	--	--	1966
625,626	880	4,200	--	--	1967
691	--	--	800	5,600	1967
630	210	1,000	--	--	1968
631	630	3,000	--	--	1968
724	--	--	1,500	10,500	1968
647	420	2,000	--	--	1969
651	210	1,000	--	--	1969
652	310	1,500	--	--	1969
725	--	--	1,700	11,900	1969
666	420	2,000	--	--	1970
670	420	2,000	--	--	1970
729	--	--	2,000	14,000	1970
673	1,040	5,000	--	--	1971
727	--	--	1,900	13,300	1971
671	520	2,500	--	--	1972
678	310	1,500	--	--	1972
716,717	--	--	1,000	7,000	1972
723	--	--	1,100	7,700	1972
674	730	3,500	--	--	1973
728	--	--	1,000	7,000	1973
732	--	--	1,100	7,700	1973

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Elk Mountain District					
394	--	2,000	--	--	1963
355	--	2,600	--	--	1963
378	1,350	6,500	--	--	1964
108	520	2,500	--	--	1964
101	2,500	12,000	--	--	1965
372	500	2,400	--	--	1966
373	100	500	--	--	1966
395	100	500	--	--	1966
393	210	1,000	--	--	1966
386	790	3,800	--	--	1966
285	2,080	10,000	--	--	1967
402	--	--	1,100	7,700	1967
426	1,250	6,000	--	--	1968
427	310	1,500	--	--	1968
387	--	--	1,900	13,300	1968
357	940	4,500	--	--	1969
358	940	4,500	--	--	1969
388	--	--	3,000	21,000	1969
359	830	4,000	--	--	1970
360	630	3,000	--	--	1970
413	--	--	1,500	10,500	1970
414	--	--	1,900	13,300	1970

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Elk Mountain District, Cont'd.					
103	3,130	15,000	--	--	1971
401,405	--	--	2,500	17,500	1971
365	830	4,000	--	--	1972
366	730	3,500	--	--	1972
416	--	--	4,000	28,000	1972
364	1,460	7,000	--	--	1973
406	--	--	4,200	29,400	1973
Fall River District					
767	60	275	--	--	1964
765	210	1,000	--	--	1965
757	80	400	--	--	1966
707,763	100	500	--	--	1966
753	270	1,275	--	--	1967
774	--	--	1,200	8,400	1967
761	100	500	--	--	1968
794	100	500	--	--	1968
779	--	--	1,400	9,800	1968
762	420	2,000	--	--	1969
772	--	--	1,500	10,500	1969
773	--	--	1,900	13,300	1969
781	--	--	2,400	16,800	1970

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Fall River District, Cont'd.					
787	130	600	--	--	1971
789	130	600	--	--	1971
785	--	--	1,600	11,200	1971
763	160	750	--	--	1972
791	100	500	--	--	1972
782	--	--	3,000	21,000	1972
766	350	1,675	--	--	1973
782	--	--	3,000	21,000	1973
Hill City District					
565	--	1,751	--	--	1963
596	80	400	--	--	1964
545	310	1,500	--	--	1964
556	210	1,000	--	--	1964
608	290	1,380	--	--	1964
618,619	400	1,900	--	--	1964
557	270	1,300	--	--	1965
614	420	2,000	--	--	1965
569	270	1,300	--	--	1965
543	630	3,000	--	--	1966
544	380	1,800	--	--	1966
537,538	830	4,000	--	--	1967

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Hill City District, Cont'd.					
560	--	--	300	2,100	1967
543	--	--	200	1,400	1967
599	210	1,000	--	--	1968
602	100	500	--	--	1968
606	--	--	800	5,600	1968
540,541	830	4,000	--	--	1969
559	--	--	250	1,750	1969
613	--	--	400	2,800	1969
567	420	2,000	--	--	1970
601	310	1,500	--	--	1970
612	--	--	500	3,500	1970
591	830	4,000	--	--	1971
593	--	--	200	1,400	1971
565	--	--	400	2,800	1971
560	630	3,000	--	--	1972
548	250	1,200	--	--	1972
610	--	--	200	1,400	1972
567	--	--	200	1,400	1972
611	--	--	300	2,100	1972
559	830	4,000	--	--	1973
591	--	--	700	4,900	1973

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Nemo District					
146	--	4,000	--	--	1963
159,160	--	4,000	--	--	1964
168	--	900	--	--	1964
134,133	--	--	570	4,000	1964
142,135,143	--	--	570	4,000	1964
124	--	1,000	--	--	1965
126	--	3,000	--	--	1965
201,178,177,165 180	--	--	1,430	10,000	1965
175	--	500	--	--	1966
174	--	500	--	--	1966
116,115	--	2,500	--	--	1966
131,128,110,132 130	--	--	1,140	8,000	1966
137	1,250	6,000	--	--	1967
119	--	--	1,100	7,700	1967
121	--	--	1,300	9,100	1967
39	310	1,500	--	--	1968
111	420	2,000	--	--	1968
124	420	2,000	--	--	1968
177	--	--	1,200	8,400	1968
200,201	--	--	1,000	7,000	1968

Compartment Number	Sawtimber		Products		Fiscal
	Acres	MBF	Acres	M Cords	Year
Nemo District, Cont'd.					
122	830	4,000	--	--	1969
203	--	--	900	6,300	1969
147,148	--	--	1,500	10,500	1969
153	630	3,000	--	--	1970
154	730	3,500	--	--	1970
122,123	--	--	1,800	12,600	1970
127	--	--	500	3,500	1970
112	1,150	5,500	--	--	1971
146	--	--	1,100	7,700	1971
145	--	--	1,000	7,000	1971
174	--	--	220	1,560	1971
116	730	3,500	--	--	1972
123	420	2,000	--	--	1972
126	--	--	900	6,300	1972
138	--	--	700	4,900	1972
115	1,000	4,800	--	--	1973
116,117	--	--	1,500	10,500	1973
Pactola District					
351	--	5,040	--	--	1963
291	630	3,000	--	--	1964
309	--	--	290	2,000	1964

Compartment Number	Sawtimber		Products		Fiscal
	Acres	MBF	Acres	M Cords	Year
Pactola District, Cont'd.					
295	--	--	290	2,000	1964
337	--	--	290	2,000	1964
552	1,130	5,400	--	--	1965
337	--	--	290	2,000	1965
338	--	--	290	2,000	1965
334	580	2,800	--	--	1966
307	290	1,400	--	--	1966
300	--	--	430	3,000	1966
335	--	--	430	3,000	1966
300	520	2,500	--	--	1967
299	210	1,000	--	--	1967
351	--	--	1,000	7,000	1967
189	830	4,000	--	--	1968
333	--	--	570	4,000	1968
340	--	--	430	3,000	1968
346	--	--	430	3,000	1968
313	520	2,500	--	--	1969
314	420	2,000	--	--	1969
307	--	--	1,400	9,800	1969
305	210	1,000	--	--	1970
303	310	1,500	--	--	1970
332	310	1,500	--	--	1970

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Pactola District, Cont'd.					
334	--	--	1,600	11,200	1970
552	1,250	6,000	--	--	1971
347	--	--	690	4,800	1971
348	--	--	430	3,000	1971
193	520	2,500	--	--	1972
297	520	2,500	--	--	1972
307	--	--	1,500	10,500	1972
294	420	2,000	--	--	1973
291,294,295	--	--	1,700	11,900	1973
Rochford District					
99	--	23,000	--	--	1963
265	--	--	--	1,600	1963
210	--	--	--	6,000	1963
255,254,253,252	310	1,500	--	--	1964
264	310	1,500	--	--	1964
290	--	--	1,140	8,000	1964
241	--	--	570	4,000	1964
74	2,710	13,000	--	--	1965
266	--	--	290	2,000	1965
225	--	--	3,910	27,400	1965
258	1,100	5,300	--	--	1966

Compartment Number	Sawtimber		Products		Fiscal
	Acres	MBF	Acres	M Cords	Year
Rochford District, Cont'd.					
99	--	--	1,140	8,000	1966
214	--	--	430	3,000	1966
100	4,170	20,000	--	--	1967
207	--	--	800	5,600	1967
215	310	1,500	--	--	1968
74	--	--	1,600	11,200	1968
216	210	1,000	--	--	1969
214	630	3,000	--	--	1969
212	--	--	300	2,100	1969
271	--	--	300	2,100	1969
75	3,130	15,000	--	--	1970
240	--	--	1,100	7,700	1970
72	730	3,500	--	--	1971
73	520	2,500	--	--	1971
235	--	--	800	5,600	1971
238	290	1,400	--	--	1972
236	210	1,000	--	--	1972
270	--	--	700	4,900	1972
239	310	1,500	--	--	1973
100	--	--	500	3,500	1973
211	--	--	300	2,100	1973

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Spearfish District					
80	--	--	--	42,800	1963
66	470	2,250	--	--	1963
30	--	--	--	2,000	1963
85	4,170	20,000	--	--	1964
84	310	1,500	--	--	1964
86	2,710	13,000	--	--	1965
060,061	--	--	710	5,000	1965
026	1,750	8,400	--	--	1966
060,061	--	--	710	5,000	1966
20	4,580	22,000	--	--	1967
36	--	--	570	4,000	1967
49	830	4,000	--	--	1968
50	210	1,000	--	--	1968
29	--	--	2,000	14,000	1968
069,070,071	1,040	5,000	--	--	1969
27	--	--	1,500	10,500	1969
51	210	1,000	--	--	1970
28	1,040	5,000	--	--	1970
33	310	1,500	--	--	1970
84	--	--	1,500	10,500	1970
021,022,023	3,130	15,000	--	--	1971
85	--	--	290	2,000	1971

Compartment Number	Sawtimber		Products		Fiscal Year
	Acres	MBF	Acres	M Cords	
Spearfish District, Cont'd.					
86	--	--	360	2,500	1971
67	210	1,000	--	--	1972
25	1,040	5,000	--	--	1972
56	--	--	1,500	10,500	1972
80	2,270	10,900	--	--	1973
29	--	--	2,000	14,000	1973

Table 15

Timber Access Roads Proposed for Construction from Appropriated Funds
By Ranger Districts

Compartment		Road		Kind of		Estimated	Date Survey
No.	Name	No.	Name	Work	Miles	Total Cost	Needed
Bearlodge District							
10	Beaver Creek	843	Redwater	C-R	2	74,700	1963
10	Beaver Creek	841	Togus Spring	C	6	59,700	1963
16	Houston Creek		Lost Houston	C	1.1	3,200	1968
16	Houston Creek		Continental	C	1.6	4,020	1969
11	Lame Jones		Cole Creek Brh.	C	1.0	2,000	1972
Bear Mountain District							
571	Newton Fork #1	304	Dwyer	R	5.7	28,000	1964
571	Newton Fork #1	386	Battleaxe	R	2.0	18,000	1964
473	Cage		Duck Lake Brh.	C	1.7	8,000	1972
Custer District							
691	Nine Mile		Wabash Ridge	C	1.7	10,000	1972

Table 15, Cont'd.

Compartment No.	Compartment Name	Road No.	Road Name	Kind of Work	Miles	Estimated Total Cost	Date Survey Needed
Elk Mountain District							
378	Severns	1541	Sled Canyon	R	2.3	11,500	1963
378	Severns	1544	Compton Dam	C	1.3	12,000	1963
406	Gillette		Surveyors Hill	C	2.9	18,000	1970
Fall River District							
781	McRobbie		Pass Creek Brh.	C-R	3.7		1966
Hill City District							
567	West Palmer Gulch			C	2.8	18,000	1967
591	Palmer Gulch		Sunday Bear	C-R	2.5	16,900	1968
613	Upper Iron Creek		Grizzly Elk	C-R	2.6	19,600	1972
Nemo District							
124	Deadman	171	Red Hill	C	2.0	14,000	1964
201	Steamboat	149	Assman	R	1.5		1964
39	Polo		Polo Creek	C	3.1	20,000	1966
111	Pillar Creek		Two Bit	C	2.5	10,000	1968

Table 15, Cont'd.

Compartment No.	Compartment Name	Road No.	Road Name	Kind of Work	Miles	Estimated Total Cost	Date Survey Needed
Nemo District, Cont'd.							
138	Avalon		Custer Peak Brh.	C	2.5	9,000	1970
146	Camp Four		Camp Four Brh.	C-R	3.5	17,300	1972
Pactola District							
337	Upper Prairie		Upper Horse Creek	C	2.0	10,000	1968
340	Lower Victoria		Coonley Ridge	C	2.0	9,800	1969
Rochford District							
264	Hughes	407	Soholt	C-R	3.5	14,000	1963
Spearfish District							
26	Bear Gulch	131	Bear Gulch	C	3.0	35,700	1965
20	Sand Creek		Upper Sand Creek	C	2.0	8,000	1966
29	Higgens		Higgen's Ridge	C	3.5	17,000	1968
56	Iron Creek		Pettigrew Gulch	C	3.0	27,000	1970

Table 16

Timber Access Right-of-Way Needs

Location By Compartment		Road		Number of Easements	Year Needed
No.	Name	No.	Name		
500	Wilhelm	2159	Tenderfoot Cr.	8	1964
575	Hesselstrom	386	Battleaxe	1	1964
264	Hughes	407	Soholt	1	1964
378	Severns	267	Cold Cr.	1	1965
101	Upper Cold Cr.	189	Parmalee	1	1965
22	Dugout	--	Thompson Gulch	1	1966
631	McGonical	1389	Calamity Jane	1	1967
337	Upper Prairie	--	Upper Horse Cr.	2	1968
74	E. Spearfish	--	Intake Draw	1	1968
39	Polo	1074	Polo Cr.	2	1968
446	Middle Ditch Cr.	--	Ditch Pole	1	1968
591	Palmer Gulch	--	Sunday Bear	2	1968
777	Booms Canyon	--	Suterland Boom	4	1968
116	Lower Deadman	1133	Deadman Mountain	1	1969
138	Avalon	1936	Custer Pk. Branch	3	1970
56	Iron Cr.	1020	Pettigrew Gulch	1	1970
593	Pine Cr.	--	Horsethief Loop	1	1971
691	Nine Mile	--	Wabash Ridge	1	1972
92	Lower Red Canyon	--	Banton Branch	1	1973

Table 17

Total Net Volume by Stand Size Classes, Species, and Unit of Measurement
National Forest - Unreserved Commercial Forest Land

1960

Timber Type	Stand Size Class	Species	Volume Per Acre					Total Volume - Forest					South Dakota Total Volume					Wyoming Total Volume				
			Cubic Feet			Bd. Ft.		M M Cubic Feet			MMBF		M M Cubic Feet			MMBF		M M Cubic Feet			MMBF	
			5.0-8.9" dbh	9.0"+ dbh	Total	Scrib.	Inter ¼"	5.0-8.9" dbh	9.0"+ dbh	Total	Scrib.	Inter ¼"	5.0-8.9" dbh	9.0"+ dbh	Total	Scrib.	Inter ¼"	5.0-8.9" dbh	9.0"+ dbh	Total	Scrib	Int ¼"
Ponderosa Pine	Sawtimber	P	285	991	1276	4250	5044	163.4	568.7	732.1	2438.1	2893.7	129.1	431.1	560.2	1837.3	2181.3	34.3	137.6	171.9	600.8	712.5
		WS	7	12	19	55	65	4.3	6.9	11.2	31.7	37.3	2.8	4.2	7.0	19.6	22.5	1.5	2.7	4.2	12.1	14.7
		Total	292	1003	1295	4305	5109	167.7	575.6	743.3	2469.8	2931.0	131.9	435.3	567.2	1856.9	2203.8	35.8	140.3	176.1	612.9	727.2
Spruce	Sawtimber	P	--	110	110	450	542	--	2.0	2.0	8.2	9.9	--	2.0	2.0	8.2	9.9	--	--	--	--	--
		WS	262	1818	2080	8317	9708	4.8	33.3	38.1	152.2	177.7	4.8	33.3	38.1	152.2	177.7	--	--	--	--	--
		Total	262	1928	2081	8767	10250	4.8	35.3	40.1	160.4	187.6	4.8	35.3	40.1	160.4	187.6	--	--	--	--	--
All	Sawtimber	P	285	995	1280	4264	5061	163.4	570.7	734.1	2446.3	2903.6	129.1	433.1	562.2	1845.5	2191.2	34.3	137.6	171.9	600.8	712.5
		WS	16	70	86	321	375	9.1	40.2	49.3	183.9	215.0	7.6	37.5	45.1	171.8	200.2	1.5	2.7	4.2	12.1	14.7
		Total	301	1065	1366	4585	5436	172.5	610.9	783.4	2630.2	3118.6	136.7	470.6	607.3	2017.3	2391.4	35.8	140.3	176.1	612.9	727.2
Ponderosa Pine	Poletimber	P	315	176	491	643	788	115.7	64.6	180.3	236.3	289.3	106.5	58.9	165.4	215.7	264.2	9.2	5.7	14.9	20.6	25.1
Spruce	Poletimber	S	112	50	162	150	200	0.3	0.1	0.4	0.3	0.5	0.3	0.1	0.4	0.3	0.5	--	--	--	--	--
Ponderosa Pine	Seedling-Sapling	P	16	55	71	210	246	0.6	2.0	2.6	7.7	9.0	0.6	1.7	2.3	7.0	8.0	--	0.3	0.3	0.7	1.0
Ponderosa Pine	Nonstocked	P	5	71	76	265	323	0.1	1.2	1.3	4.4	5.4	0.1	0.9	1.0	3.4	4.1	--	0.3	0.3	1.0	1.3
Total		P	--	--	--	--	--	279.8	638.5	918.3	2694.7	3207.3	236.3	494.6	730.9	2071.6	2467.5	43.5	143.9	187.4	623.1	739.9
		S	--	--	--	--	--	9.4	40.3	49.7	184.2	215.5	7.9	37.6	45.5	172.1	200.7	1.5	2.7	4.2	12.1	14.7
		Total	255	598	853	2535	3014	289.2	678.8	968.0	2878.9	3422.8	244.2	532.2	776.4	2243.7	2668.2	45.0	146.6	191.6	635.2	754.6

Table 18

Area and Volume by Volume Stratum - National Forest Unreserved Commercial Forest Land

1960

V.S. No.	Adjusted Area in Vol. Stratum Forest: Total	M Acres So. Dak.	Wyo.	Species	Volume Per Acre Cubic Ft. 5.0-8.9"	9.0"+	Total	Bd. Ft. Scrib.	Int. ¼"	Forest - Total Volume M M Cubic Feet 5.0-8.9"	9.0"+	Total	MMBF Scrib.	Int. ¼"	So. Dakota-Total Volume M M Cubic Feet 5.0-8.9"	9.0"+	Total	MMBF Scrib.	Int. ¼"	Wyoming Total Volume M M Cubic Feet 5.0-8.9"	9.0"+	Total	MMBF Scrib.	Int. ¼"
1	--	--	--	PP	165.3	133.8	1503.1	7000	7677	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	--	--	--	WS	6.1	--	6.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
				Total	171.4	133.8	1509.2	7000	7677	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2	--	--	--	PP	315.8	1451.1	1766.9	6438	7630	32.6	149.8	182.4	664.4	787.4	12.8	58.6	71.4	260.1	308.3	19.8	91.2	111.0	404.3	479.2
(2-2)*	103.2	40.4	62.8	WS	18.7	38.1	56.8	170	206	1.9	3.9	5.8	17.5	21.3	0.7	1.5	2.2	6.9	8.3	1.2	2.4	3.6	10.6	12.9
				Total	334.5	1489.2	1823.7	6608	7836	34.5	153.7	188.2	681.9	808.7	13.5	60.1	73.6	267.0	316.6	21.0	93.6	114.6	414.9	492.1
3	--	--	--	PP	229.3	734.2	963.5	3109	3692	130.8	418.9	549.7	1773.7	2106.3	116.3	372.5	488.8	1577.2	1873.0	14.5	46.4	60.9	196.5	233.3
(2-3)	570.5	507.3	63.2	WS	4.2	5.4	9.6	25	28	2.4	3.0	5.4	14.2	16.0	2.1	2.7	4.8	12.7	14.2	0.3	0.3	0.6	1.5	1.8
				Total	233.5	739.6	973.1	3134	3720	133.2	421.9	555.1	1787.9	2122.3	118.4	375.2	493.6	1589.9	1887.2	14.8	46.7	61.5	198.0	235.1
4 (3-1)	42.1	40.1	2.0	PP	547.8	146.0	693.8	550	685	23.1	6.1	29.2	23.2	28.8	22.0	5.8	27.8	22.1	27.5	1.1	0.3	1.4	1.1	1.3
5 (3-2)	306.3	280.5	25.8	PP	297.3	182.6	479.9	670	819	91.1	55.9	147.0	205.2	250.9	83.4	51.2	134.6	187.9	229.7	7.7	4.7	12.4	17.3	21.2
6 (3-3)	18.9	13.7	5.2	PP	78.4	135.3	213.7	416	508	1.5	2.6	4.1	7.9	9.6	1.1	1.9	3.0	5.7	7.0	0.4	0.7	1.1	2.2	2.6
7 (4-1)	1.7	1.7	--	PP	25.0	--	25.0	--	--	0.1	--	0.1	--	--	0.1	--	0.1	--	--	--	--	--	--	--
8 (4-2)	19.2	18.1	1.1	PP	10.2	51.0	61.2	196	231	0.2	1.0	1.2	3.8	4.4	0.2	0.9	1.1	3.6	4.1	--	0.1	0.1	0.2	0.3
9 (4-3)	15.7	13.4	2.3	PP	19.2	61.7	80.9	250	290	0.3	1.0	1.3	3.9	4.6	0.3	0.8	1.1	3.4	3.9	--	0.2	0.2	0.5	0.7
10 (5-0)	16.7	12.8	3.9	PP	4.8	71.6	76.4	265	323	0.1	1.2	1.3	4.4	5.4	0.1	0.9	1.0	3.4	4.1	--	0.3	0.3	1.0	1.3
11	--	--	--	PP	--	110.0	110.0	450	542	--	2.0	2.0	8.2	9.9	--	2.0	2.0	8.2	9.9	--	--	--	--	--
41 (2-2)	18.3	18.3	--	WS	262.5	1818.3	2080.8	8317	9708	4.8	33.3	38.1	152.2	177.7	4.8	33.3	38.1	152.2	177.7	--	--	--	--	--
				Total	262.5	1928.3	2190.8	8767	10250	4.8	35.3	40.1	160.4	187.6	4.8	35.3	40.1	160.4	187.6	--	--	--	--	--
12 (3-2)	2.3	2.3	--	PP	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
				WS	112.5	49.5	162.0	150	200	0.3	0.1	0.4	0.3	0.5	0.3	0.1	0.4	0.3	0.5	--	--	--	--	--
				Total PP	279.8	638.5	918.3	2694.7	3207.3	236.3	494.6	730.9	2071.6	2467.4	43.5	143.9	187.4	623.1	739.9					
				WS	9.4	40.3	49.7	184.2	215.5	7.9	37.6	45.5	172.1	200.8	1.5	2.7	4.2	12.1	14.7					
				Total	289.2	678.8	968.0	2878.9	3422.8	244.2	532.2	776.4	2243.7	2668.2	45.0	146.6	191.6	635.2	754.6					

* Stand Size and Stocking Code

Table 19

Annual Net Growth and Mortality
National Forest Unreserved Commercial Forest Land

GPO 834165

1960

Volume Stratum No.	Kind Of Volume	Annual Per Acre		Forest Total			South Dakota			Wyoming		
		Net Growth	Mortality	Area M Acres	Total Annual Net Growth M Units	Total Annual Mortality M Units	Area M Acres	Total Net Growth	Total Mortality	Area M Acres	Total Net Growth	Total Mortality
1	Cu. Ft.	20.32	2.33	--	--	--	--	--	--	--	--	--
	Scrib.	99.91	6.75	--	--	--	--	--	--	--	--	--
	Int.¼"	109.28	7.34									
2	Cu. Ft.	35.81	1.69	103.2	3,696	174	40.4	1,446.7	68	62.8	2,249.3	106
	Scrib.	155.97	6.89	--	16,096	711	--	6,301.2	278	--	9,794.8	433
	Int.¼"	173.20	7.93	--	17,874	818	--	6,997.3	320	--	10,876.7	498
3	Cu. Ft.	22.98	1.15	570.5	13,110	656	507.3	11,657.8	583	63.2	1,452.2	73
	Scrib.	82.57	4.23	--	47,106	2,413	--	41,887.8	2,146	--	5,218.2	267
	Int.¼"	89.00	4.83	--	50,774	2,756	--	45,149.7	2,450	--	5,624.3	306
4	Cu. Ft.	30.76	0.07	42.1	1,295	3	40.1	1,233.5	3	2.0	--	--
	Scrib.	20.94	0.27	--	882	11	--	839.7	11	--	--	--
	Int.¼"	25.37	0.34	--	1,068	14	--	1,017.3	14	--	--	--
5	Cu. Ft.	16.41	0.97	306.3	5,026	297	280.5	4,603.0	272	25.8	423.0	25
	Scrib.	27.96	0.63	--	8,564	193	--	7,842.8	177	--	721.2	16
	Int.¼"	34.27	0.77	--	10,497	236	--	9,612.7	216	--	884.3	20
6	Cu. Ft.	5.10	0.86	18.9	96	16	13.7	69.8	11	5.2	26.2	4
	Scrib.	9.05	3.01	--	171	57	--	124.0	41	--	47.0	16
	Int.¼"	12.00	3.42	--	227	65	--	164.4	47	--	62.6	18
7	Cu. Ft.	2.50	--	1.7	4	--	1.7	4.0	--	--	--	--
8	Cu. Ft.	1.49	2.12	19.2	29	41	18.1	27.0	38	1.1	2.0	3
9	Cu. Ft.	3.72	--	15.7	58	--	13.4	49.8	--	2.3	8.2	--
10	Cu. Ft.	2.09	--	16.7	35	--	12.8	26.8	--	3.9	8.2	--
11	Cu. Ft.	46.64	12.71	18.3	854	233	18.3	854.0	233	--	--	--
	Scrib.	194.91	58.57	--	3,567	1,072	--	3,567.0	1,072	--	--	--
	Int.¼"	228.00	66.19	--	4,172	1,211	--	4,172.0	1,211	--	--	--
12	Cu. Ft.	7.85	--	2.3	18	--	2.3	18.0	--	--	--	--
	Scrib.	10.0	--	--	23	--	--	23.0	--	--	--	--
	Int.¼"	12.5	--	--	29	--	--	29.0	--	--	--	--
13	Cu. Ft.	1.5	--	--	--	--	--	--	--	--	--	--
14	Cu. Ft.	--	--	--	--	--	--	--	--	--	--	--
Forest Total				M M Units								
Cu. Ft.				1,114.9	24.2	1.4	948.6	20.0	1.2	166.3	4.2	0.2
Scrib.				--	76.4	4.5	--	60.6	3.8	--	15.8	0.7
Int.¼"					84.6	5.1	--	67.1	4.3	--	17.5	0.8